APPENDIX A

FACILITY LICENSE NO. R-80
TECHNICAL SPECIFICATIONS
FOR THE
CORNELL UNIVERSITY
TRIGA RESEARCH REACTOR
DOCKET NO. 50-157

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1.0 DEFINITIONS

The following frequently used terms are defined to aid in the uniform interpretation of these specifications.

Channel Calibration: A channel calibration is an adjustment of the channel so that its output responds, with acceptable range and accuracy, to known values of the parameter that the channel measures.

Channel Check: A channel check is a qualitative verification of acceptable performance by observation of channel behavior. This verification shall include comparison of the channel with expected values, or other independent channels or methods of measuring the same variable.

Channel Test: A channel test is the introduction of an input signal into a channel to verify that it is operable.

Control Rod, Standard: A standard control rod is one having rack and pinion, electric motor drive, and scram capability.

Control Rod, Transient: A transient rod is one that is pneumatically operated and has scram capability.

Engineered Safety Features: Engineered safety features are features of a unit, other than reactor trip or those used only for normal operation, that are provided to prevent, limit, or mitigate the release of radioactive material.

Experiment: An experiment is (1) any apparatus, device, or material placed in the reactor core region (in an experimental facility associated with the reactor, or in line with a beam of radiation emanating from the reactor) or (2) any incore operation designed to measure reactor characteristics.

Experimental Facility: Experimental facilities are the beamports, thermal column, pneumatic transfer systems, central thimble, rotary specimen rack, and the incore facilities (including single-element positions, and the seven-element position).

FSR: The "Final Safeguards Report to the U.S. Atomic Energy Commission for the Cornell University TRIGA Reactor" (CURL-2), May 1961 plus Supplement No. 1 as revised in March 1983.

Hexagonal Section: A hexagonal section is a part of the upper grid plate that can be removed for insertion of specimens up to 5.0 in. in diameter after relocation of the six B-ring elements and removal of the central thimble.

Independent Experiments: Independent experiments are those not connected by a mechanical, chemical, or electrical link.

Measured Value: The measured value of a parameter is the value as it appears at the output of a measuring channel.

Measuring Channel: A measuring channel is the combination of sensor, lines, amplifiers, and output devices that are connected for the purpose of measuring the value of a process variable.

Movable Experiment: A movable experiment is one that may be moved in or near the core or into and out of the reactor while the reactor is operating.

Nonsecured Experiment: Nonsecured experiments are those that should not move while the reactor is operating, but are held in place with less restraint than a secured experiment.

Normal Mode Operation: Normal mode operation is operation with a stainless-steel-clad-high-hydride thermocouple fuel element in the core.

Operable: A system or component is operable when it is capable of performing its intended function in a normal manner.

Operating: A system or component is operating when it is performing its intended function in a normal manner.

Pulse Mode: The reactor is in the pulse mode when the reactor mode selection switch is in the pulse position. In this mode, reactor power is increased on periods less than 1 sec by motion of the transient control rod.

Reactor Safety System: The reactor safety system is that combination of measuring channels and associated circuitry that is designed to initiate reactor scram or that provides information that requires manual protective action to be initiated.

Reactor Secured: The reactor is secured when all of the following conditions are satisfied:

(1) reactor shutdown
(2) electrical power to the control rod circuits is switched off and the switch key is in proper custody
(3) no work is in progress involving incore components, experiments, or installed control rod drives

Reactor Shutdown: The reactor is in a shutdown (subcritical) condition when the negative reactivity of the cold, clean core is equal to or greater than the shutdown margin.

Reportable Occurrences: A reportable occurrence is any of the conditions described in Section 6.9 of these specifications.

Research Reactor: A research reactor is one primarily designed to supply neutrons or ionizing radiation for experimental purposes.

Restricted Mode Operation: Restricted mode operation is operation with one aluminum-clad low-hydride thermocouple fuel element in the B-ring and no stainless-steel-clad high-hydride thermocouple fuel element in the core.

Ring: A ring is one of the five concentric bands of fuel elements surrounding the central opening of the core. The rings are designated by the letters B through F, with the letter B used to designate the innermost ring

Safety Channel: A safety channel is a measuring channel in the reactor safety system.

Secured Experiment: A secured experiment is an experiment held firmly in place by a mechanical device or by gravity providing that the weight of the experiment is such that it cannot be moved by a force of less than 60 lb.

Secured Experiment With Movable Parts: A secured experiment with movable parts is one that contains parts that are intended to be moved while the reactor is operating.

Shutdown Margin: The shutdown margin is the minimum shutdown reactivity necessary to provide confidence that the reactor can be made sub-critical by means of the control and safety systems, starting from any permissible operating condition, and that the reactor will remain sub-critical, without further operator action.

Standard Thermocouple Fuel Element: A standard thermocouple fuel element is a standard fuel element containing three sheathed thermocouples imbedded in the fuel element.

Steady-State Mode: The reactor is in the steady-state mode when the reactor mode selection switch is in either the manual or automatic position.

True Value: The true value of a parameter is its exact value at any instant.

2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

2.1 Safety Limit – Fuel Element Temperature

Applicability: This specification applies to the fuel element temperature.

Objective: The objective is to define the maximum fuel element temperature that can be permitted with confidence that no fuel element cladding damage will result.

Specification: The temperature in a stainless-steel-clad, high-hydride fuel element shall not exceed 1,000 ^{o}C under any conditions of operation. The temperature in an aluminum-clad low-hydride fuel element shall not exceed 530 ^{o}C under any conditions of operation.

Bases: The important process variable for a TRIGA reactor is the fuel element temperature. This parameter is well suited as a single specification, and it is readily measured. A loss in the integrity of the fuel element cladding could arise from an excessive buildup of pressure between the fuel moderator and the cladding. The pressure is caused by the presence of fission product gases and dissociation of the hydrogen and zirconium in the fuel moderator. The magnitude of this pressure is determined by the fuel moderator temperature.

The safety limit for the high-hydride ($ZrH_{1.7}$) fuel elements is based on data presented in the "Hazards Report for the Oregon State University 250 kW TRIGA MARK II Reactor," General Atomic Report GA-6499, June 1965, first paragraph of Section 4.7, which indicates that the stress in the cladding (resulting from the hydrogen pressure from the dissociation of the zirconium hydride) will remain below the rupture stress provided the temperature of the fuel does not exceed 1,000 ^{o}C.

The temperature at which phase transitions that may lead to cladding failure in aluminum-clad low-hydride fuel elements is reported to be 530 ^{o}C; references: "Technical Foundations of TRIGA, "GA-471 (1958). pp. 63-72; also in "Hazards Analysis for the Oregon State University 250 kW TRIGA Mark II Reactor," (June 1965), section 4.7. There is also extensive operating experience with aluminum-clad low-hydride fuel; for example, with the Michigan State University TRIGA, which was licensed from 1974 to 1984 to operate with a mixed core of stainless-steel-clad high hydride and aluminum-clad low-hydride elements at 250 kW and up to 2$ pulses.

2.2 Limiting Safety System Settings

Applicability: This specification applies to the trip setting for the fuel element temperature channel.

Objective: The objective is to prevent the safety limit from being exceeded.

Specifications: For a core composed of stainless-steel-clad, high-hydride fuel elements, limiting safety system settings apply according to the location of the standard thermocouple fuel element as indicated in the following table:

Location	Limiting Safety System Settings
B-ring	600 ^{o}C
C-ring	555 ^{o}C
D-ring	480 ^{o}C
E-ring	380 ^{o}C

For a core containing an aluminum-clad low-hydride thermocouple fuel element (i.e., for restricted mode operation) the limiting safety system setting for that element shall be 230 ^{o}C with the element located in the B-ring.

Bases: For stainless-steel-clad, high-hydride fuel elements, the limiting safety system settings represent values of the temperature, which if exceeded, shall cause the reactor safety system to initiate a reactor scram. Because the fuel element temperature is measured in a single fuel element designed for this purpose, the limiting settings are given for different locations of that element in the core. It is assumed that the maximum fuel temperature is produced in the B-ring.

For the stainless-steel-clad, high-hydride fuel elements, the margin between the safety limit of 1,000 ^{o}C and the limiting safety system setting of 600 ^{o}C in the B-ring was selected to assure that conditions would not arise which would allow the fuel element temperature to approach the safety limit. The safety margin of 400 ^{o}C allows for differences between the measured peak temperature and calculated peak temperature encountered in pulse operation of TRIGA reactors and for uncertainty in temperature channel calibration. During steady-state operations, the equilibrium temperature is determined by the power level, the physical dimensions and properties of the fuel elements, and the parameters of the coolant. Because of the interrelationship of the fuel moderator temperature, the power level, and changes in reactivity required to increase or maintain a given power level, any unwarranted increase in the power level would result in a relatively slow increase in the fuel moderator temperature. The margin between the maximum setting and safety limit would ensure the reactor being shut down before conditions could result that might damage the fuel elements.

For the aluminum-clad, low-hydride element the margin of 300 ^{o}C between the safety limit of 530 ^{o}C and the limiting safety system setting of 230 ^{o}C in the B-ring was selected to assure that conditions would not arise which would allow the fuel element temperature to approach the safety limit. The margin is large enough to allow for differences in properties of all aluminum-clad, all stainless-steel-clad, and mixed cores and for uncertainty in temperature channel calibration.

3.0 LIMITING CONDITIONS FOR OPERATION

3.1 Reactivity

This specification was removed as part of the possession only amendment since operation has permanently ceased and all fuel has been transferred to the Department of Energy.

3.2 Steady-State Operation

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3.3 Pulse Operation

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(3.4) Measuring Channels

Applicability: This specification applies to the facility radiation measuring channels.

Objective: The objective is to require that sufficient information is available to the facility operating staff to ensure safe personnel safety.

Specifications: If radioactive material is handled, moved inside or removed from the reactor room, the following conditions shall be met

The measuring channels (fixed or portable) described in the following table are turned on and operable, with information adequately displayed.

Measuring Channel	Minimum Number Operable	Required Operating Mode
Area radiation monitors	2	NA

As a result of reactor shut down and all fuel transferred to the Department of Energy the danger from radiation is greatly reduced. Accordingly, the reactor monitoring channels and the continuous air and exhaust plenum radiation monitors are no longer needed.

The need for protection against potential airborne radiation hazards during decommissioning is addressed in subsections **Respiratory Protection and TEDE ALARA Evaluations** and ***Airborne Effluent Monitoring*** of the NRC approved Decommissioning Plan.

Bases: The radiation monitors provide information to facility personnel of any danger from radiation so that there will be sufficient time to take the necessary steps to minimize exposure.

The function of the continuous air radiation monitor was to provide warning of fuel cladding failure, and that of the exhaust plenum to monitor the release of Ar-41 from the reactor when in operation.

3.5 Safety Channels and Control Rod Drop Time

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3.6 Release of Argon-41

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3.7 Ventilation System

*The original objective was to ensure that the ventilation exhaust shutdown system was operable to mitigate consequences of a possible release of an uncontrolled amount of radioactive materials to unrestricted areas resulting from reactor operation. As a result of reactor shut down and all fuel transferred to the Department of Energy, the reactor bay ventilation system is no longer needed. However, there may be a need for ventilation during the decommissioning. This need is addressed in the subsection **Airborne Effluent Monitoring** of the NRC approved Decommissioning Plan.*

3.8 Limitations on Experiments

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3.9 Fuel Integrity

This specification was removed as part of the possession only amendment since operation has permanently ceased and all fuel has been transferred to the Department of Energy.

3.10 Reactor Pool Water

Applicability: This specification applies to the water contained in the Cornell TRIGA reactor pool while irradiated reactor hardware is within the pool.

Objective: The objective is to set acceptable limits on the level of the reactor pool water.

Specifications: The water in the reactor pool shall be maintained at a level necessary to minimize exposure to radiation from irradiated reactor hardware remaining in the pool.

Bases: An adequate water level in the reactor pool is necessary to provide shielding from irradiated reactor hardware. Upon removal of the irradiated reactor hardware from the pool, the water level requirement shall no longer be applicable.

3.11 Restricted Mode Operation

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4.0 SURVEILLANCE REQUIREMENTS

4.1 Fuel

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4.2 Control Rods

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4.3 Reactor Safety System

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4.4 Radiation Monitoring Equipment

Applicability: This specification applies to the radiation monitoring equipment.

Objectives: The objective is to ensure that the radiation monitoring equipment is operable.

Specification: The radiation monitoring instrumentation shall be checked monthly and be operable before any radioactive materials are handled, moved inside or removed from the reactor room.

Bases: Surveillance of the equipment will ensure that sufficient protection against radiation is available.

4.5 Maintenance

This specification was removed as part of the possession only amendment since operation has permanently ceased and all fuel has been transferred to the Department of Energy.

4.6 Reactor Pool Water

Applicability: This specification applies to the water contained in the Cornell TRIGA reactor pool while irradiated reactor hardware is within the pool.

Objective: The objective is to provide surveillance of reactor pool water level.

Specifications: Per section 3.10 of these Technical Specifications, the following shall be checked monthly:

(1) the water level in the reactor pool shall be maintained at a level necessary to minimize exposure to radiation from irradiated reactor hardware remaining in the pool.

Bases: Surveillance of the reactor pool will ensure that the water level is adequate for shielding purposes.

4.7 Special Nuclear Materials

This specification was removed as part of the possession only amendment since operation has permanently ceased and all fuel has been transferred to the Department of Energy, and all SNM removed from Ward Center for Nuclear Science.

5.0 DESIGN FEATURES

5.1 Reactor Fuel

This specification was removed as part of the possession only amendment since operation has permanently ceased and all fuel has been transferred to the Department of Energy.

5.2 Reactor Building

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5.3 Fuel Storage

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6.0 Administrative Controls

6.1 Organization and Responsibilities of Personnel

a) The TRIGA Reactor located in the J. Carlton Ward Jr. Laboratory of Nuclear Engineering shall be an integral part of the Ward Center for Nuclear Sciences of Cornell University. The reactor organization shall be related to the University structure as shown in Chart I

b) The Vice Provost for Research Administration shall be the Project Director for the Decommissioning and Decontamination of the Cornell Ward Center for Nuclear Sciences. He shall appoint responsible and competent persons as members of the Cornell Decommissioning and Decontamination Oversight Committee, the Director of the Ward Center for Nuclear Sciences, and the Cornell Project Manager.

c) The Ward Laboratory (including but not limited to the TRIGA Reactor) shall be under the supervision of the Center Director, who shall have the overall responsibility for safe, efficient, and competent use of its facilities in conformity with all applicable laws, regulations, terms of facility licenses, and provisions of the Cornell Decommissioning and Decontamination Oversight Committee. He or she shall also have responsibility for maintenance and modification of Laboratory facilities. He or she shall have education and/or experience commensurate with the responsibilities of the position. He or she shall report to the Vice Provost for Research Administration.

d)

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e)

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f)

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g) The University Radiation Safety Officer (URSO), or his/her deputy, shall (in addition to other duties defined by the Director of Environmental Health and Safety) be responsible for overseeing the safety of Ward Center operations from the standpoint of radiation protection. He or she shall be appointed by the Director of Environmental Health and Safety with the approval of the University Radiation Safety Committee. He or she shall report to the Director of Environmental Health and Safety, whose organization is independent of the Ward Center organization, as shown on Chart I.

h) The Center Director, with the approval of the Cornell Decommissioning and Decontamination Oversight Committee, may designate an appropriately qualified member of the Center

organization as Ward Center Radiation Safety Officer (WCSRO) with duties including those of an intra-Center Radiation Safety Officer. The University Radiation Safety Officer may at his or her discretion, and with the concurrence of the Center Director, authorize the WCSRO to perform specific duties of the URSO at Ward Center.

i) The Cornell Project Manager for the Decommissioning and Decontamination of the Ward Center for Nuclear Sciences shall be responsible for communicating with regulators, for overseeing the project, for ensuring that all activities comply with applicable regulations and are performed in accordance with license conditions. He or she shall oversee inspections and quality assurance activities related to the D&D process and report findings. He or she shall report to the Vice Provost for Research Administration.

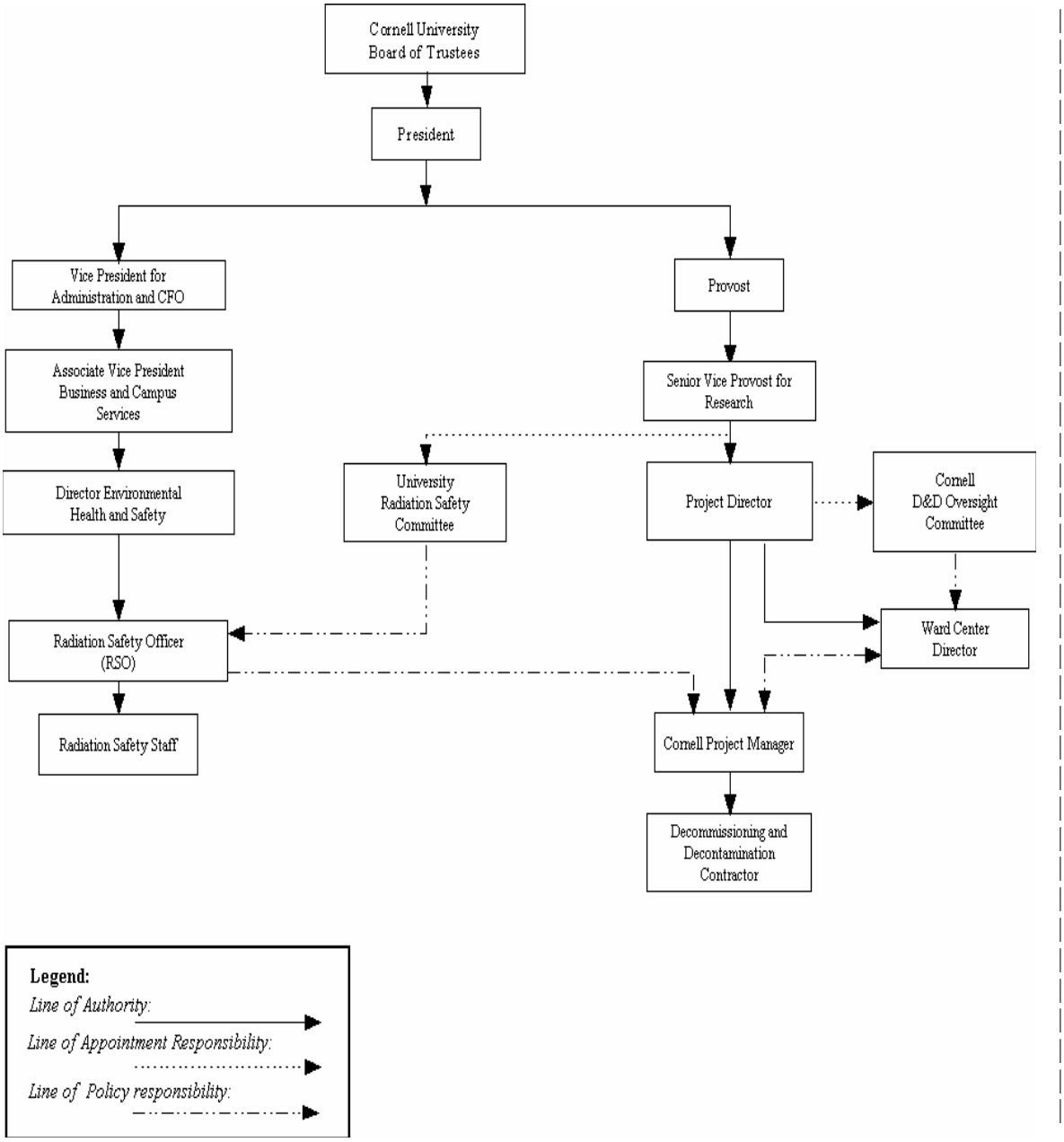

Chart I. Organizational Structure

6.2 Review and Audit

a) There will be a Cornell Decommissioning and Decontamination Oversight Committee which shall review laboratory operations associated with decommissioning and decontamination of the Ward Center for Nuclear Sciences and to assure that the facility is used in a manner within the terms of the facility license and consistent with the safety of the public and of persons within the Laboratory.

b) The responsibilities of the Committee include, but are not limited to, the following;

1. Review and approval of rules, procedures, and proposed Technical Specifications;
2. Review and approval of all proposed changes in the facility that could have a significant effect on safety and of all proposed changes in rules, procedures, and Technical Specifications, in accordance with procedures in Section 6.3;
3. Review and approval of experiments using the reactor in accordance with procedures and criteria in Section 6.4;
4. Determination of whether a proposed change, test or experiment would constitute an un-reviewed safety question or change in the Technical Specifications (Ref. 10 CFR 50.59);
5. Review of the operation and operations records of the facility;
6. Review of abnormal performance of plant equipment and operating anomalies;
7. Review of unusual or abnormal occurrences and incidents which are reportable under 10CFR20 and 10 CFR 50;
8. Inspection of the facility, review of safety measures, and audit of operations at a frequency not less than once a year; and
9. Approval of appointments of Responsible Persons.

c) The Committee shall be composed of:

1. one or more persons proficient in nuclear physics, shielding and instrumentation
2. one or more persons proficient in chemistry or chemical engineering,
3. one person proficient in biological effects of radiation,
4. the Center Director,
5. the University Radiation Safety Officer or his or her deputy,
6. one person proficient in geological sciences,
7. one person proficient in civil and environmental engineering,
8. one person from the University Office of Planning, Design and Construction or his or her deputy,
9. one person from the University Office of Environmental Health and Safety or his or her deputy,
10. one person from the Division of University Relations or his or her deputy,
11. the Vice Provost for Physical Sciences and Engineering, or his or her deputy ,
12. the Cornell Project Manager or his or her deputy, and,
13. the Project Director or his or her deputy.

The same individual may serve under more than one category above, but the minimum membership shall be seven. At least four members shall be faculty members.

d) The Committee shall have a written statement defining its authority and responsibilities, the subjects within its purview, and other such administrative provisions as are required

for its effective functioning. Minutes of all meetings and records of all formal actions of the Committee shall be kept.

e) The chairman of the Committee shall be the Vice Provost for Physical Sciences and Engineering. A quorum shall consist of not less than a majority of the full Committee and shall include the chairman or his or her designee.

f) The Committee shall meet a minimum of two times a year.

6.3 Procedures

a) Written procedures, reviewed and approved by the Cornell Decommissioning and Decontamination Oversight Committee shall be followed for the activities listed below. The procedures shall be adequate to assure the safety of the reactor, persons within the Laboratory, and the public, but should not preclude the use of independent judgment and action should the situation require it. The activities are:

1.
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2.
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3. Preventive or corrective maintenance activities which could have a significant effect on the safety of the reactor or personnel.

4. Periodic inspection, testing or calibration of auxiliary systems.

5. Decommissioning and decontamination activities at the Ward Center for Nuclear Sciences.

b) Substantive changes in the above procedures shall be made only with the approval of the Cornell Decommissioning and Decontamination Oversight Committee, and shall be issued to the appropriate personnel in written form. Temporary changes that do not change the original intent may be made by the Center Director. The change and the reasons thereof shall be noted in the log book, and shall be subsequently reviewed by the Cornell Decommissioning and Decontamination Oversight Committee.

c) Determination as to whether a proposed activity in categories (1), (2) and (3) in Section 6.2(b) above does or does not have a significant safety effect and therefore does or does not require approved written procedures shall require the concurrence of:

1. the Center Director, and
2. at least one other member of the Cornell Decommissioning and Decontamination Oversight Committee, to be selected for relevant expertise by the Center Director. If the Director and the Committee member disagree, or if in their judgment the case warrants it, the proposal shall be submitted to the full Committee, and
3. the University Radiation Safety Officer, or his or her deputy, who may withhold agreement

until approval by the University Radiation Safety Committee is obtained.

Determinations that written procedures are not required shall be subsequently reviewed by the Cornell Decommissioning and Decontamination Oversight Committee. The time at which determinations are made, and the review and approval of written procedures, if required, are carried out, shall be a reasonable interval before the proposed activity is to be undertaken.

d) Determination that a proposed change in the facility does or does not have a significant safety effect and therefore does or does not require review and approval by the full Cornell Decommissioning and Decontamination Oversight Committee, shall be made in the same manner as the proposed activities under (c) above.

6.4 Review of Proposals for Experiments

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6.5 Emergency Plan and Procedures

An emergency plan is on file in accordance with NRC regulations. Any changes to the plan and existing emergency procedures shall be reviewed and approved by the Cornell Decommissioning and Decontamination Oversight Committee.

6.6 Operator Re-qualification

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6.7 Physical Security Plan

A physical security plan for protection of the reactor plant shall be established and followed in accordance with NRC regulations.

6.8 Action To Be Taken In The Event A Safety Limit Is Exceeded

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6.9 Action To Be Taken In The Event Of A Reportable Occurrence

a) A reportable occurrence is any uncontrolled or unanticipated release of radioactivity.
b). In the event of a reportable occurrence, the following actions shall be taken

1. A report shall be made to include an analysis of the cause of the occurrence, efficacy of corrective action, and recommendations for measures to prevent or reduce the probability of

recurrence. This report shall be submitted to the Cornell Decommissioning and Decontamination Oversight Committee for review.

2. A report shall be submitted to the NRC in accordance with Section 6.11 of these specifications.

6.10 Plant Operating Records

a) In addition to the requirements of applicable regulations, in 10 CFR 20 and 50, records and logs shall be prepared and retained for a period of at least 5 years for the following items as a minimum:

1. normal plant operation, including power levels:
2. principal maintenance activities;
3. reportable occurrences;
4. equipment and component surveillance activities;
5. experiments performed with the reactor;
6. all emergency reactor scrams, including reasons for emergency shutdowns.

b) The following records shall be maintained for the life of the facility:

1. gaseous and liquid radioactive effluents released to the environs;
2. offsite environmental monitoring surveys;
3. fuel inventories and transfers;
4. facility radiation and contamination surveys;
5. radiation exposures for all personnel;
6. updated, corrected, and as-built drawings of the facility;
7. decontamination shipping records.

6.11 Reporting Requirements

All written reports shall be sent within the prescribed interval to the United States Nuclear Regulatory Commission, Washington, D.C., 20555, Attn: Document Control Desk, with a copy to the Regional Administrator, Region I.

In addition to the requirements of applicable regulations, and in no way substituting therefor, reports shall be made to the U.S. Nuclear Regulatory Commission (NRC) as follows:

a) A report within 24 hours by telephone and telegraph to the NRC Operation Center and Region I, of;
1. any accidental release of radioactivity above permissible limits in unrestricted areas, whether or not the release resulted in property damage, personal injury, or exposure;

2. any violation of a safety limit;

3. any reportable occurrences as defined in Section 6.9(a) of these specifications

b) A report within 10 days in writing to the NRC Operation Center and Region I of;

1. any accidental release of radioactivity above permissible limits in unrestricted areas, whether or

2. not the release resulted in property damage, personal injury or exposure; the written report (and, to the extent possible, the preliminary telephone and telegraph report) shall describe, analyze, and evaluate safety implications, and outline the corrective measures taken or planned to prevent recurrence of the event;
3. any violation of a safety limit;
4. any reportable occurrence as defined in Section 6.9(a) of these specifications.

c) A report within 30 days in writing to the Branch Chief, Events Assessment, Generic Communications and Non-Power Reactors Branch, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 of;

1. any significant variation of measured values from a corresponding predicted or previously measured value of safety-connected operating characteristics occurring during operation of the reactor;

2. any significant change in the transient or accident analysis as described in the FSR.

d)

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e) A routine report in writing to the U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, DC 20555 and Region I, within 60 days after completion of the first calendar year of operating and at intervals not to exceed 12 months, thereafter, providing the following information:

3. a brief narrative summary of operating experience (including experiments performed), changes in facility design, performance characteristics, and operating procedures related to reactor safety occurring during the reporting period; and results of surveillance tests and inspections;
4. a tabulation showing the energy generated by the reactor (in megawatt-hours);
5. the number of emergency shutdowns and inadvertent scrams, including the reasons thereof and corrective action, if any, taken;
6. discussion of the major maintenance operations performed during the period, including the effects, if any, on the safe operation of the reactor, and the reasons for any corrective maintenance required;
7. a summary of each change to the facility or procedures, tests, and experiments carried out under the conditions of 10 CFR 50.59;
8. a summary of the nature and amount of radioactive effluents released or discharged to the environs beyond the effective control of the licensee as measured at or before the point of such release or discharge;
9. a description of any environmental surveys performed outside the facility;
10. a summary of radiation exposures receive by facility personnel and visitors, including the dates and time of significant exposure, and a brief summary of the results of radiation and contamination surveys performed within the facility.